Lencore
Acoustics Corp.™

INSTALLATION MANUAL

Y2K compliant and UL listed.

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HOW TO BEGIN

Work in sections/zones. The size of each zone will be equivalent to the number of masking units allotted per transformer. Size of transformer will determine quantity of units for each zone. (page 6)

A. REVIEW PLANS to determine a starting point and assign responsibilities (page 2)

B. DETERMINE LOCATION OF UNITS and place them on the floor below these locations (page 2)

C. POP THE CEILING TILES WHERE THE UNITS ARE TO BE HUNG (page 2)

It is important to solve problems immediately. It is much easier while you are still working in the same section.

D. RUN CABLE (page 3)
The notes that follow denote our installers preferred method of running cable and hanging units. Your methods may vary.

E. PRESET MASTER UNITS (page 3)

F. HANG SOUND MASKING UNITS (page 4)

G. CONNECT UNITS (page 4)

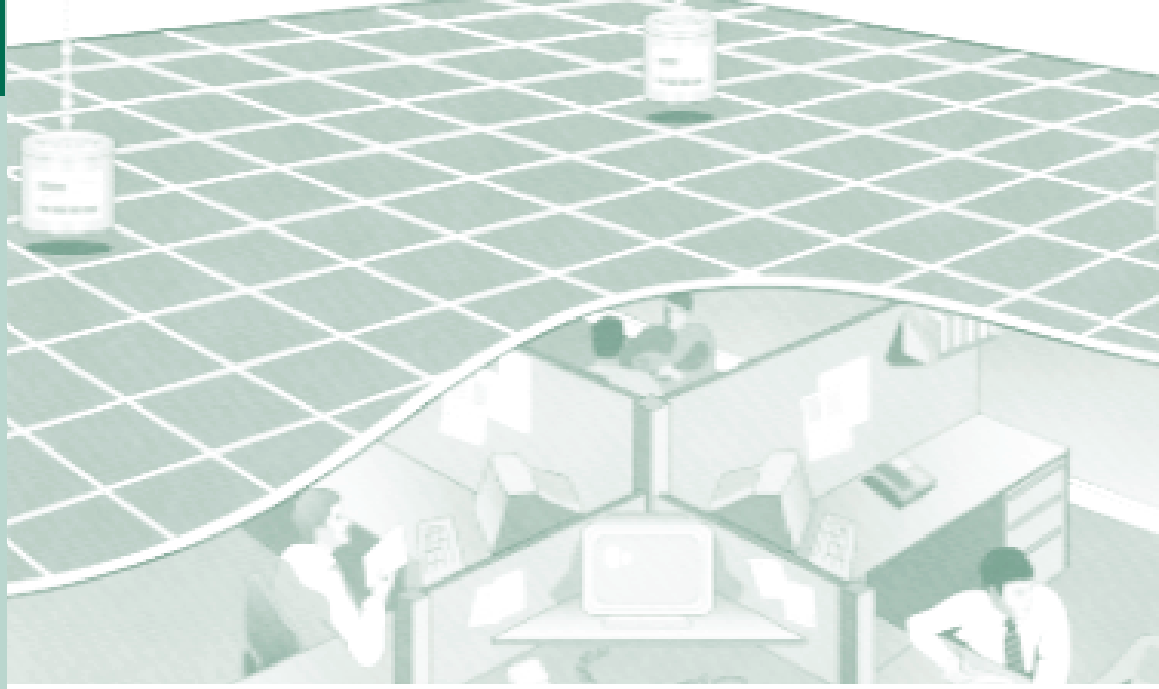
H. RUN HOME RUN CABLE(S) TO THE TRANSFORMER FOR POWER

I. WHERE APPLICABLE RUN THE CABLE TO THE CENTRAL VOLUME CONTROL UNIT (CVC) (page 4)

J. TEST EACH SECTION BEFORE LEAVING ZONE

Control sound and obtain speech privacy in your office environment

Lencore Sound Masking Spectra® Units are UL listed.



REVIEW PLANS AND ASSIGN RESPONSIBILITIES

Installation team should meet and review the plans and assign responsibilities to each team member.

Check to see if a low-voltage permit is required in your area

Determine a starting point.

DETERMINE LOCATION OF UNITS

The plan should be broken down into zones. Every project has at least one zone. Each zone is connected to a 16-18volt step down transformer that typically handles up to 30 units or more (page 5).

Using the plans, walk through the floor and set units on the floor below each designated location, until they can be installed above the ceiling.

Note any areas of obstruction, and place units as close as possible to these locations as marked on the plan.

POP THE CEILING TILES

When working on a large project, it is best to have one of the team members begin as soon as the meeting is over to start popping tiles where the units are to be hung (drawing provided). If it is allowed, small dot stickers are a good idea. Stick the dots on the ceiling strips to show where the units are located. Use a different color for the Masters, Slaves and Central Volume Control unit (CVC).

RUN CABLE

A tool that will help you considerably and save probably 50% in time is a telescopic pole. Most poles will reach 25-30 ft but a 15-ft. pole should work well.

All Wire must be UL Listed, Plenum Rated, 18 gauge, stranded, non-shielded

DO NOT LEAVE AN AREA UNTIL ALL CABLE IS RUN

PRESETTING MASTER UNITS

Two-conductor wire can be used to power the masters as well being used to hook up two slave units to the master. Four-conductor will be used for the masters when paging/music or a CVC is used. If all combinations are used then six-conductor wire is necessary and one color wire will be tied back. Keep in mind that the black wire is common throughout.

One pair (2-conductor) is always used from middle of run to transformer, middle of run to CVC, Master to Amplifier, and Master to Slave.

SUGGESTION: When doing a large project, at least one team member should be assigned to run cable. This should begin as soon as the other team member begins popping ceiling tiles. Run the Master cable first, then the Slave cable, and repeat, then run the cable to the transformer, CVC & PA where applicable.

Note: Our installers prefer using this method for cabling: Pass the wire from unit to unit with a telescopic pole or by throwing the (2, 4, or 6 conductor) cable from the first master to the second master in the zone. Then pass/throw 2-conductor cable from the first master to each of its slave units; once these cables are in place proceed to the next set of master and slave units, repeat until you finish the zone.

Leave enough cable at each ceiling opening so that you have an extra 3-5 ft. This cable will be made into a loop once the unit has been hung and put in the ceiling using a 7" wire tie. The cabling connecting the units should not be too tight. Once installed, cable cannot touch the ceiling (use the wire ties to accomplish this).

In most acoustical ceiling environments, it is a good idea to preset the volume on each master.

On each master unit, turn each center volume control on the masters seven clicks and the blue gain control 3/4 clockwise. This is especially helpful when using a CVC unit. In that case, if the volume is slightly up or down, all of the units can be adjusted by the CVC. This saves a great deal of time. This may vary depending on the quantity of units and the height of the plenum area.Masking units come from the factory preset for mineral fiber ceiling tile. If glass fiber ceiling tile is used the contour switch must be turned 3/4 to the left towards the pink spectrum.

Note: If private offices are included, units should be set lower in these offices. Suggest 3 clicks on center switch and 1/2 turn on gain control.

PRESETTING CVC (CENTRAL VOLUME CONTROL)

Turn each master center volume control to the 7th position. Turn the blue gain control 3/4 clockwise. Put the CVC blue central volume control in the middle position. This is a good starting point. Then only minor volume adjustments should be made. This setup will vary from location to location and will also vary depending on plenum heights.

HANG SOUND MASKING UNITS

Use Erico Multi-Function Clips, 4-Z-3-4 to hang units. Hang them approximately 10" above the ceiling tile at the designated location. Each Spectra®“ unit is suspended from the nearest T-Bar hanger by chain. It is important you hang the units at a uniform height throughout, otherwise, you risk the chance of less uniformity of sound when the units are turned on.

Find out if plenum rated tie wraps must be used on your particular project.

The units are normally placed 6-9 ft. from the hard walls and usually 12-15 ft. apart. Once you get in the ceilings, there are almost always changes that need to be made. You may run into heater ducts and other obstacles that make it impossible to install the units in the exact spot that the plans suggest. If you need to hang the unit in a different area, that’s OK. Hang the units as close to the suggested area as possible. A team member should follow behind the cable person(s) and begin hanging units.

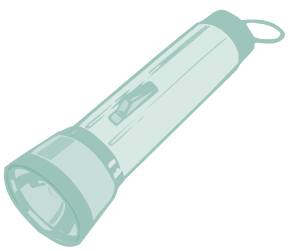
New construction may require that units be attached directly to the deck above. Verify what method must be used for hanging units prior to undertaking the installation.

CONNECT UNITS

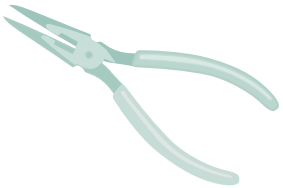
This is the most critical part of the entire operation. The most thorough members of your team should do this task. All of the efficiency of your installation can be lost if you have connection problems. Units are wired in parallel.

Supply each of the team members connecting the units with a wiring diagram.

M A T E R I A L S N E E D E D



WIRE STRIPPER
NEEDLE NOSE PLIERS
BLUE WIRE NUTS
RED WIRE NUTS
FLASHLIGHT
8’ LADDER
7” WIRE TESTIE WRAPS
WORK APRON WITH POCKETS
CADDY CLIPS



WIRE COLOR CODE

WIRE COLOR	PURPOSE	CONNECTION
RED/BROWN	Power	Master to Master Master to Transformer
WHITE/BLACK	Audio Speaker Out	Master to Slave *White wire is used for Slave only. No other purpose.*
BLUE/BLACK	Level Control	Only run one pair from middle of run when using CVC/Timer to CVC/Timer
GREEN/BLACK when using PA	25v/Audio In	Only run one pair from middle of run to amplifier

v e r y i m p o r t a n t

FINAL CHECK OF AREA AND PRE-SETTING DECIBEL LEVEL

Again, use the most skilled people for this job.

It is very important on a large job to check an area (approximately 30 units) before leaving it. Power the area - use one of the transformers. Power with an electric cord with a plug on one end and screw connectors on the other end. Connect power cord to black wires of transformer. Hook wire from home run to the two screws on the transformer and plug in. Use the sound meter to test sound level. Find an area near a Slave where all of the ceilings are closed to get a reading.

The ideal reading is between 47.5 and 48 dB. If this is not the level of the sound, adjust using the middle volume control or if you have a CVC and all of the Masters were preset, you can do the final adjustment for the whole area there. Allow to run for approximately 15 minutes. If the transformer overheats or you can hear a loud humming sound, you have incorrectly wired unit(s).

Note: It may be necessary for you to make 2 or more additional trips to fine tune the project once the space is furnished.

A great sound makes no noise™

HOOKING UP TRANSFORMER

Power is to be connected by an electrical contractor.
Installer to provide a UL 1411 recognized transformer with an output of 16/18 volts. Use 16-18 volt step down transformers. These are designed to be connected to junction boxes. There is a knock out plug on the side of the junction box for the smaller 40va transformer. Several transformers can be connected to a junction box if you are bringing all of the home runs to a central area. A separate circuit is recommended.

TRANSFORMER CAPACITY CHART*

All transformers 16/18v	40va	75va	95va
Masking Only no page	42 units	78 units	99 units
Masking with moderate paging levels	21 units	39 units	48 units
Masking with maximum paging levels	12 units	24 units	33 units

* All capacity information assumes a ration of one master to two slaves.

POWER REQUIREMENTS FOR SOUND MASKING TRANSFORMERS

Please have your electrician install one or more 120 volt/20 amp circuits in a 4-inch square box (see sample). This electrical box should be installed above the acoustical ceiling in the cubical area or in a centrally located electrical closet

Junction Box measures 4-inches square, 2 1/8 inches deep

Typically, one standard junction box can handle up to (4) 40va transformers or (1) 75/95va transformers. Be sure to specify and have your electrician install enough junction boxes to accommodate the number of units for your specific project.

INSTRUCTIONS FOR USING THE SIMPSON MODEL 884-2 SOUND METER (OR EQUIVELANT SOUND METER)

1. **Turn large round dial to 50**
2. **Make sure fast/slow setting is on slow**
3. **Hold meter approximately 4’ above floor**

It takes approximately 30 seconds for meter to respond to sound. 0 to 50 dB...you want the reading to be to the left of the 0. -10 would be 40 dB. You need a reading between -2.5 and -1.5 on the meter. This would be 47.5 to 48.5 dB. It would naturally be higher with the ceiling open. For more information see sketch of sound level meter in diagram section at back of this manual. (page 32)

Approximately 2 weeks later, or when ceiling tiles and furniture are all in place, reset units to 47.5 to 48.5 four feet above floor.

PROBLEMS AND QUESTIONS THAT MAY ARISE

LOUD NOISE COMING FROM MASTER AND SLAVE

This means that there is a miswire. Go to Master and recheck wiring, as it probably is a ground wire problem. Walk the area and listen for a loud humming sound. In many cases, this will indicate which unit is miswired.

TRANSFORMER OVERHEATING

As in the above scenario, you have incorrectly wired unit(s) and need to search out the source. Again, walk the area and listen for a loud humming sound. The Master unit humming is the one wired incorrectly. Power half of the Masters, if the transformer doesn't overheat, the problem is in the other half. Check each of the remaining Master wires or split the area in half again. There is always a slight possibility that a Master has the short and it's not the wiring.

NO SOUND IN AN AREA

Check the wires as they may not be connected correctly or may not have good contact. If that is not the case, you have a bad Master. Before you replace the Master, test a second time with test cord and transformer separately.

IMPOSSIBLE TO HANG UNIT WHERE DRAWING SHOWS

If an obstacle is in the way, move the unit to the nearest area on the drawing where an obstacle does not create any problems.

HOW FAR ABOVE CEILING SHOULD UNITS BE HUNG?

The units should be reachable from a standard 6-8' ladder. A minimum of 10" above the ceiling tiles is recommended. Most importantly, the units must be hung at a uniform height throughout the space for correct tuning, give or take several inches.

WHAT IF THE AREA TO HANG UNITS HAS A LIGHT OR GRATING?

Move to the next acoustical tile and hang the unit there. Always hang units over acoustical tiles.

WHAT HAPPENS WHEN YOU HANG A UNIT CLOSE TO AN AIR RETURN OPEN GRILL OR ANY AREA, WHICH ALLOWS THE MASKING SOUND TO PASS FREELY THROUGH WITHOUT THE CEILING TILE FILTERING THE SOUND?

Turn the switch on the bottom of the unit marked contour until the masking sound blends into the existing masking sound in the environment. By doing this you have taken out the harsh sound that has passed through the ceiling unfiltered.

Units should not be visible through grill

CVC QUESTIONS

Loss of power in units when home run connected to CVC

Make sure you only connected the blue and black wires to the CVC (middle of run)
The wire may not be making contact
Problem is in almost every instance connected to the wiring pattern you used
Recheck wiring of CVC
If everything checks out--may have bad CVC

How many wires do you connect from Master home of runs to CVC?

Only connect the blue and black wire to CVC except for area where CVC is part of run. If CVC is part of a run, connect just like you would any Master in run. Check diagrams that show CVC wiring pattern. (page 16)

Can you hook Slaves to a CVC?

Yes, CVC is treated like a regular Master in area it is placed. Check diagram that explains wiring pattern. (page 16) (1 - Slave recommended)

TIMER QUESTIONS

If a programmable timer has been included in your project, please consult the timer manual.

QUESTIONS ABOUT PA SYSTEM

What wire pattern is required to hook up the PA system?

Use the green and black wire.

If you don't want the PA in a certain area?

Do not hook up the green wire in the Master to the run of Master cable for the area that you do not want to be hooked to the PA. The only consideration is that the Slaves hooked to the non-connected Master also are not going to have PA capability. The green wire must be hooked from one run of the main cable to the next or the run will stop there. Also, there is an adjustment for paging volume on every Master. This will give you further flexibility to turn the page/music up or down or off.

What to do if the sound is distorted?

There are two main causes and both of them are simple to fix. The most common solution is that the volume of your amplifier is too loud. The volume control is very sensitive. Slight turns can make a great deal of difference. If the distortion is only in a single area, more than likely you have a unit hanging at an angle. Rehang so that it is straight. Also, you may try to turn down the base, which should help.

What to do if sound does not come on?

Did you turn up the volume to the amplifier? Is the amplifier plugged in? Is the amplifier turned on?

What if the Sound masking volume goes down when the PA is used?

Check that there are the correct number of units per transformer.

What if the PA does not work in an entire section of units?

The home run of that area has not been run to the amplifier.

PAGING

Each Master unit (LM6) and CVC unit (LM6-CVC) has a paging / music input. This is the GREEN wire (25V) and BLACK wire (COM). Both units also have a paging volume control. This control is factory set in MID position.

Connect the GREEN wires of all Masters and CVC's of a particular paging zone together to create a home run. Do the same for the BLACK wires. Connect this home run to the 25-volt output terminal of the paging power amplifier. GREEN to 25V, BLACK to COM.

MICROPHONE PAGING INPUT CONNECTIONS

TOA BG-115 amplifier example...

MIC/TEL	selector switch in MIC position.
Microphone Hi	connect to MIC/TEL INPUT terminal HOT.
Microphone Lo	connect to MIC/TEL INPUT terminal COM.
Microphone shield	connect to MIC/TEL INPUT terminal E.

These wires are located within Shield

See BG-115 instruction manual for muting options.

In installations where paging is not utilized and the GREEN wire is not connected, the paging volume control should be set to minimum position (i.e., counter clockwise) in order to avoid stray electrical noise pickup.

TOA A-901A, A-903, A-906, A-912 example...

M-01	series plug-in modules.
Microphone Hi	connect to HOT, terminal 3.
Microphone Lo	connect to COM, terminal 2.
Microphone shield	connect to E, terminal 1.

Choose appropriate module type for muting options needed.

M-01S	no muting.
M-11S	module can be muted.
M-41S	voice activated muting of other modules.
M-51S	voice gate (voice activated un-muting).
M-61S	compressor.

TELEPHONE PAGING INPUT CONNECTIONS

In order to utilize a telephone paging system a telephone interface module is required. This can be a Bogen PCM 2000 series, a Valcom V-2006A interface system, Nortel option PBX-Trunk Card NT8D14 or other telephone decoding system.

TOA BG-115 amplifier example...

MIC/TEL	selector switch in TEL position.
RING	from trunk card connect to MIC/TEL INPUT terminal HOT.
TIP	from trunk card connect to MIC/TEL INPUT terminal COM.
Optional:	FRAME ground shield connect to MIC/TEL INPUT terminal G.

See BG-115 instruction manual for muting options if a PAGE PORT contact closure is provided.

TOA A-901A, A-903, A-906, A-912 example...

L-01	series plug-in modules.
RING	from trunk card connect to HOT, terminal 3.
TIP	from trunk card connect to COM, terminal 2.
Optional:	FRAME ground shield connect to E, terminal 1.

Choose appropriate module type for muting options needed.

L-01S	no muting.
L-11S	module can be muted.
L-41S	voice activated muting of other modules.

MUSIC, TAPE, CD INPUT CONNECTIONS:

TOA BG-115 amplifier example...

10k-ohm, balanced.
Use two conductor shielded cable.
Hi from player connect to PROGRAM terminal HOT.
Lo from player connect to PROGRAM terminal COM.
GND shield connect to PROGRAM terminal G.

OR

RCA phono plug, 10K-ohm unbalanced.
Use two single conductor shielded cables.
Connect left channel to top AUX phono plug and right channel to bottom AUX phono plug.
See BG-115 instruction manual for muting options.

TOA A-901A, A-903, A-906, A-912 example...

10K-ohm, balanced.
B-01 series plug-in modules.
Use two conductor shielded cable.
Hi from player connect to HOT, terminal 3.
Lo from player connect to COM, terminal 2.
GND shield connect to E, terminal 1.

Choose appropriate module type for muting options needed.

B-01S	no muting.
B-11S	module can be muted.
B-41S	music activated muting of other modules.

220K-ohm, unbalanced.
U-01 series plug-in modules.
Use single conductor shielded cable.
Hi from player connect to HOT, terminal 3.
GND shield connect to EARTH, terminal 2.

Choose appropriate module type for muting options needed.

U-01S	no muting.
U-11S	module can be muted.
U-21S	remote volume.

MISCELLANEOUS

T-01S, 600-ohm balanced output module.
T-02S, 220K-ohm unbalanced in, 600-ohm balanced out.

With the various paging amplifiers and input/output modules, one can design zone paging, all call paging with mutable background music. For maximum versatility, zone and all call paging should be provided through the telephone interface module and should be done by the customer's telephone system installer. Lencore Acoustics Corp.™ does not provide this service.

EQUIPMENT LIST FOR INSTALLATION

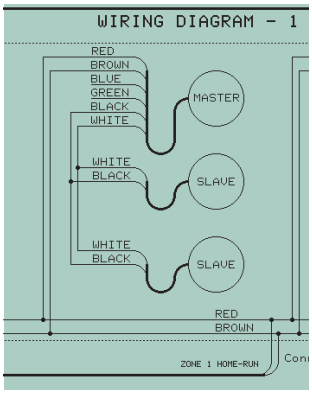
1. **Wire Strippers**
2. **Blue and Red Wire Nuts**
3. **Caddy Clips**
4. **Wire Tie/Wraps – check if these must be plenum rated**
5. **Needlenose pliers**
6. **Small flathead screw driver**
7. **Flashlight**
8. **Tape measure**
9. **Ladder (8’ in most cases)**
10. **Work apron with pockets**
11. **Sound level meter Simpson 884-2**
12. **Cable shall be 18 gauge, Stranded, UL Recognized, Plenum Rated.**
13. **Transformer shall be UL 1411 Recognized with an Output of 16/18 Volts.**
14. **Fuse shall be UL Recognized with 2.5 amps, 125 volts (Max) Rating. Fuse holder shall be UL Recognized with same Rating.**

Optional Equipment:
Ramset or Hilti Gun
Telescopic Pole (15’ extension)

HOW TO ESTIMATE WIRE

Estimate approximately 20’ of wire per unit, allowing additional footage for home runs to transformers and/or other equipment such as CVC’s, Timers, Amplifiers, etc.

Wire can be purchased in full rolls of 1,000 feet. Standard layouts will require that two-thirds of wire purchased to be 2-conductor and the balance of wire purchased can be two, four, or six conductor depending on applications used.



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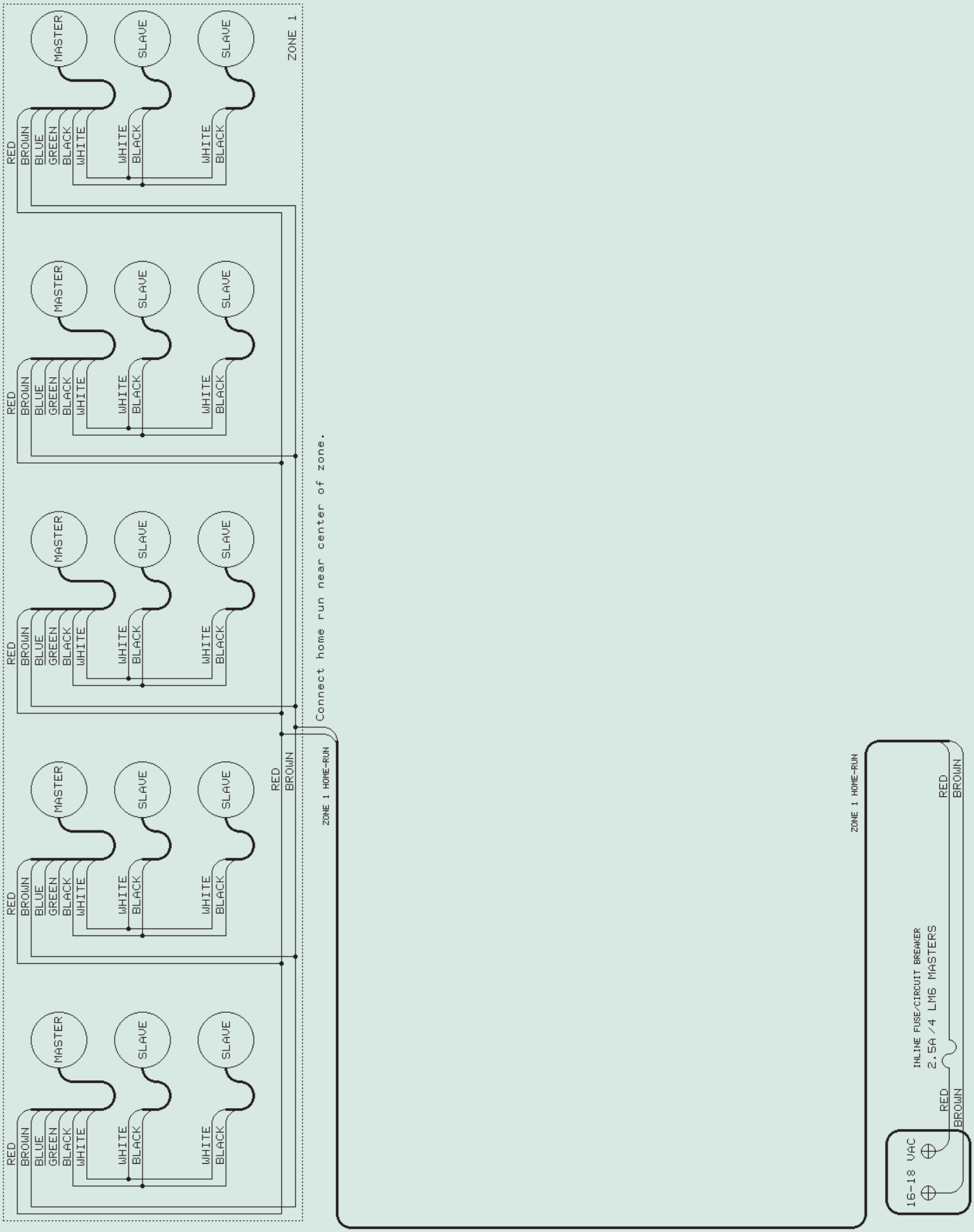
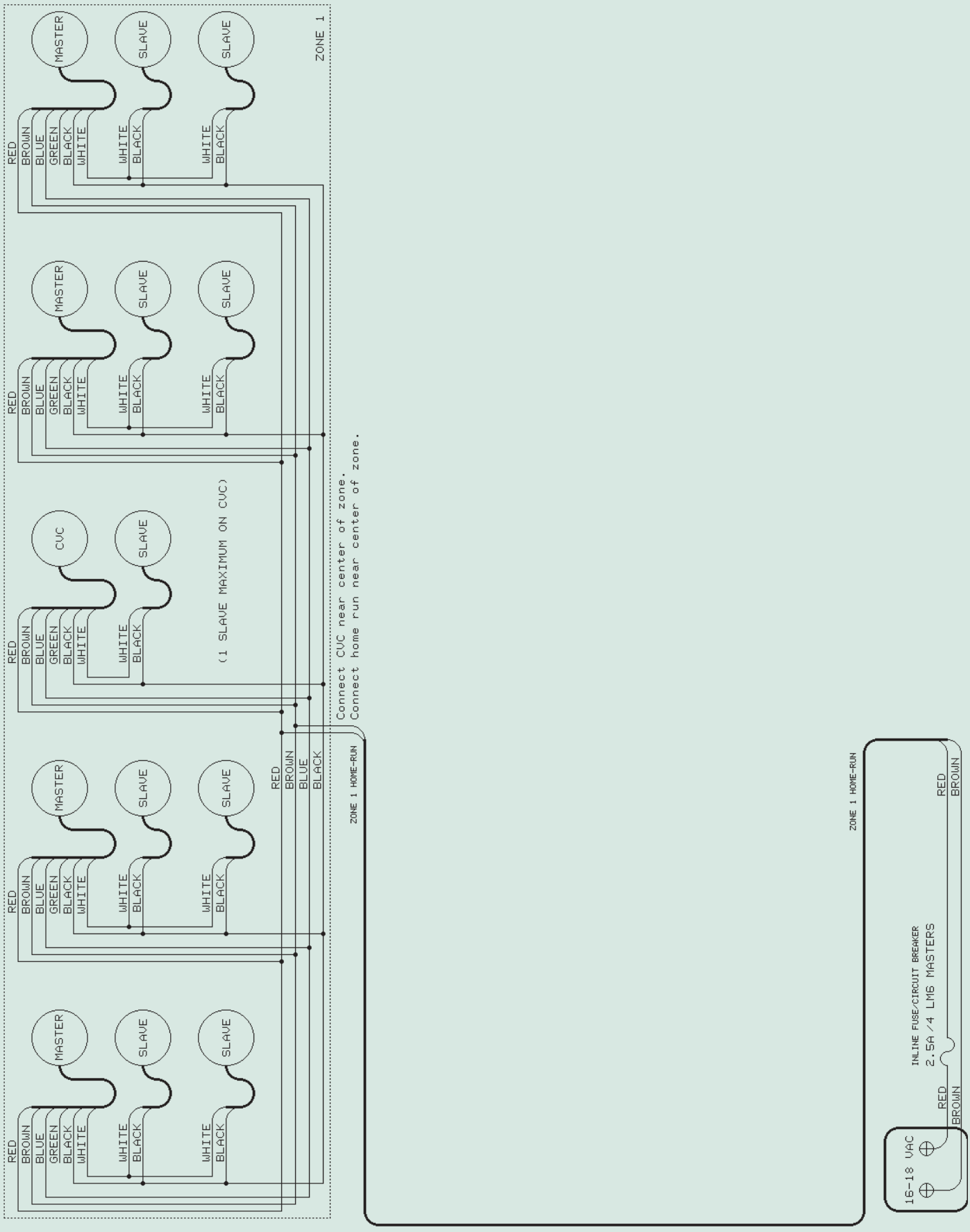
WIRING DIAGRAM - 1 ZONE, NO CVC OR TIMER, NO PAGE/MUSIC



WIRING DIAGRAM - 1 ZONE, 1 CVC, NO PAGE/MUSIC



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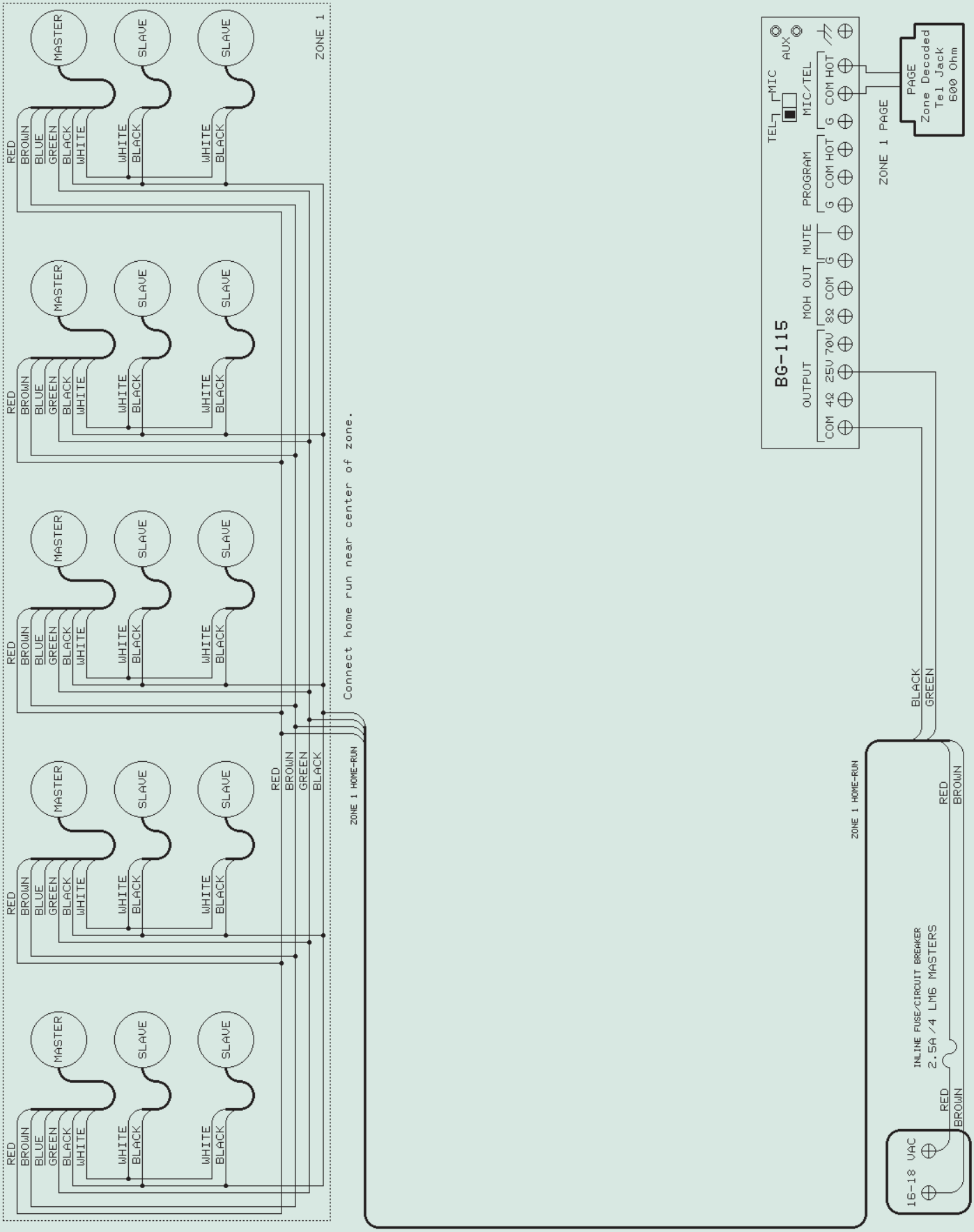

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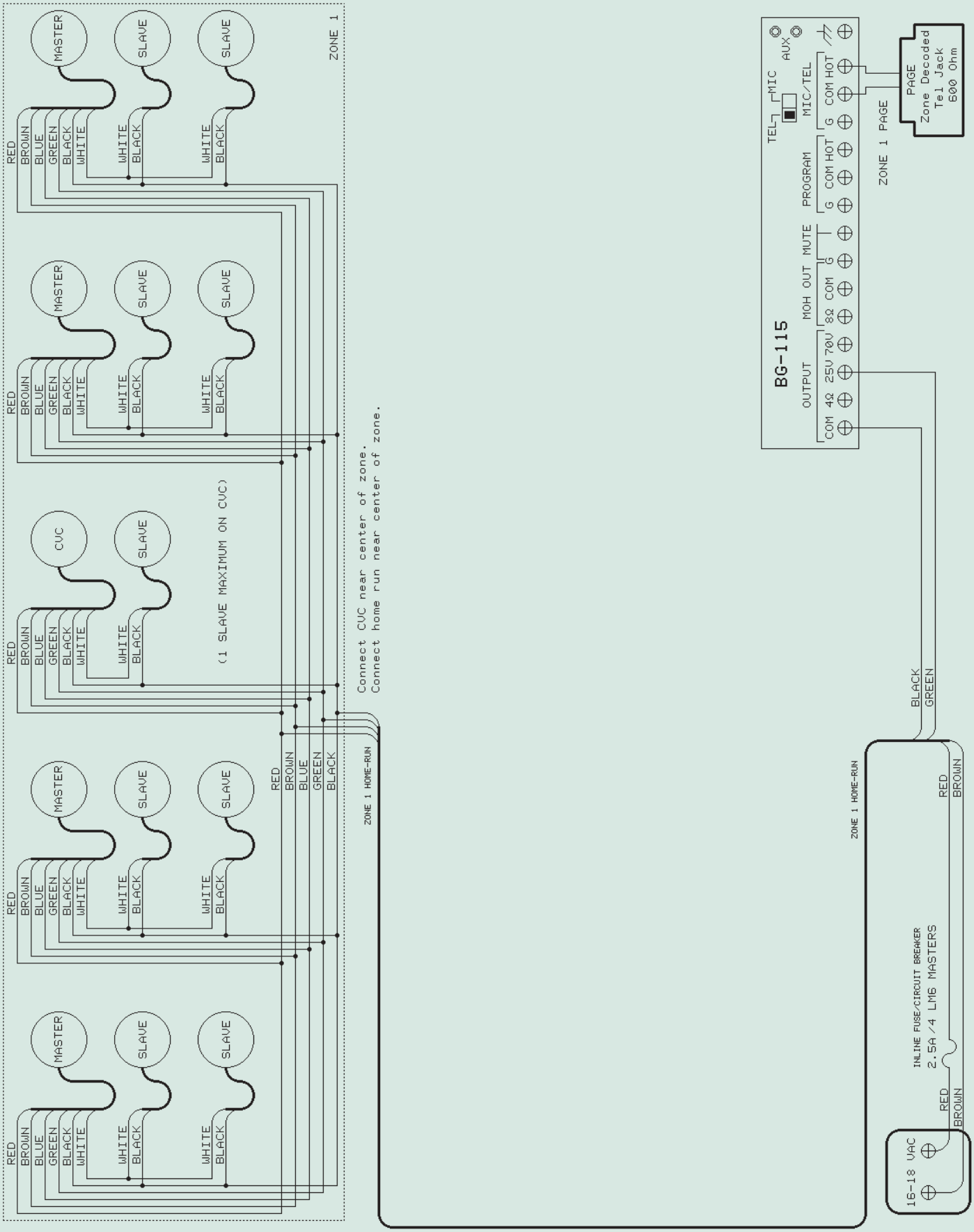

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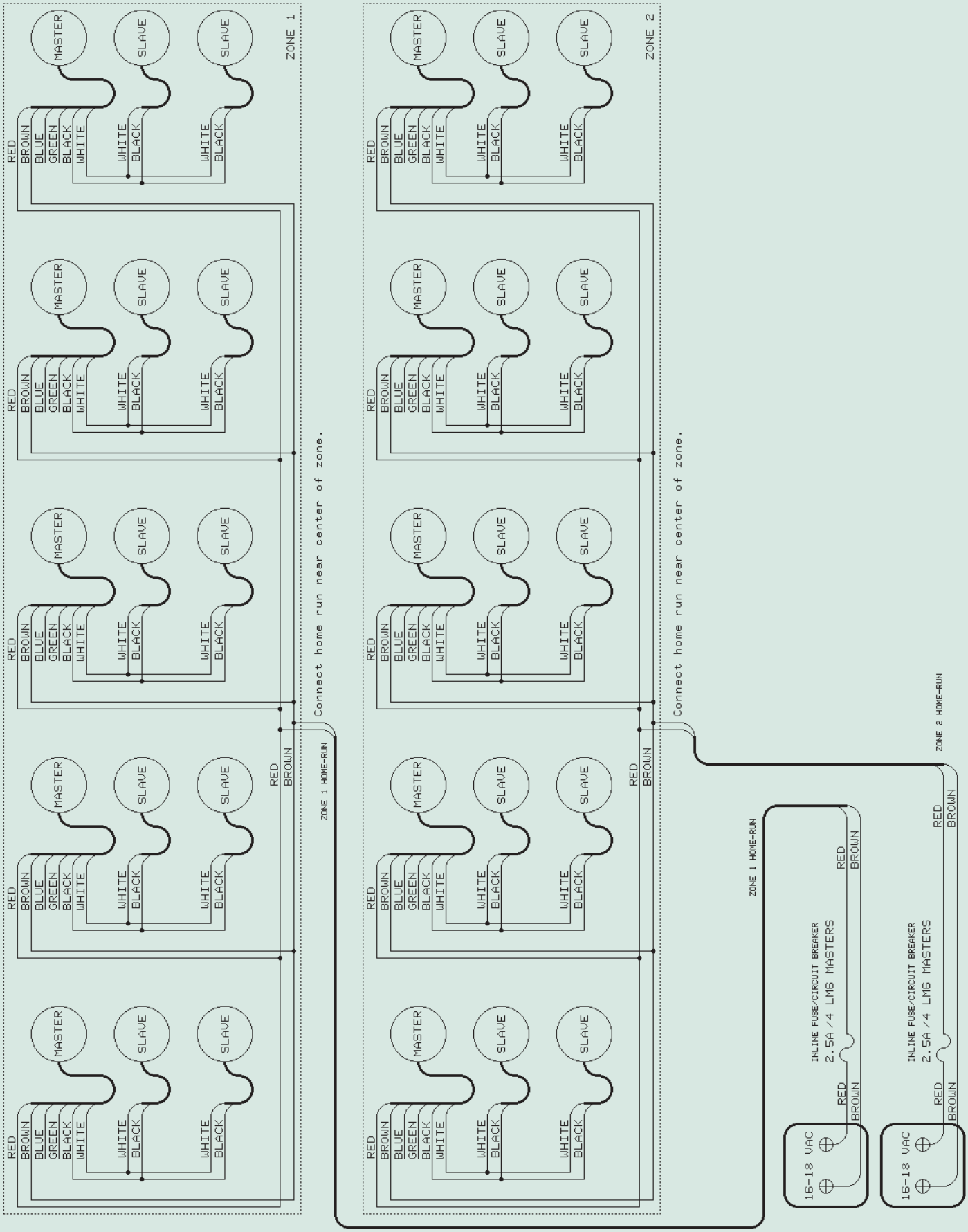
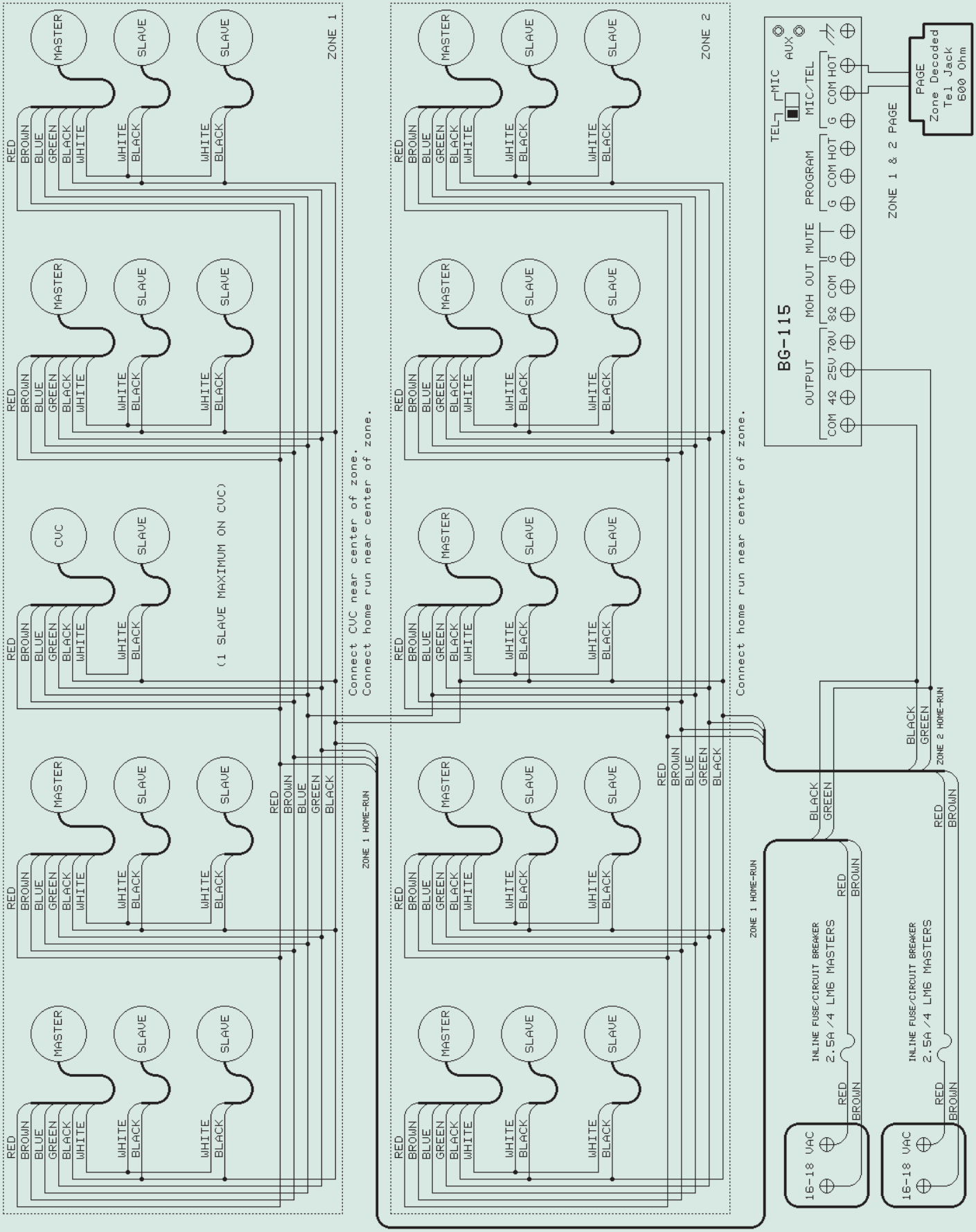
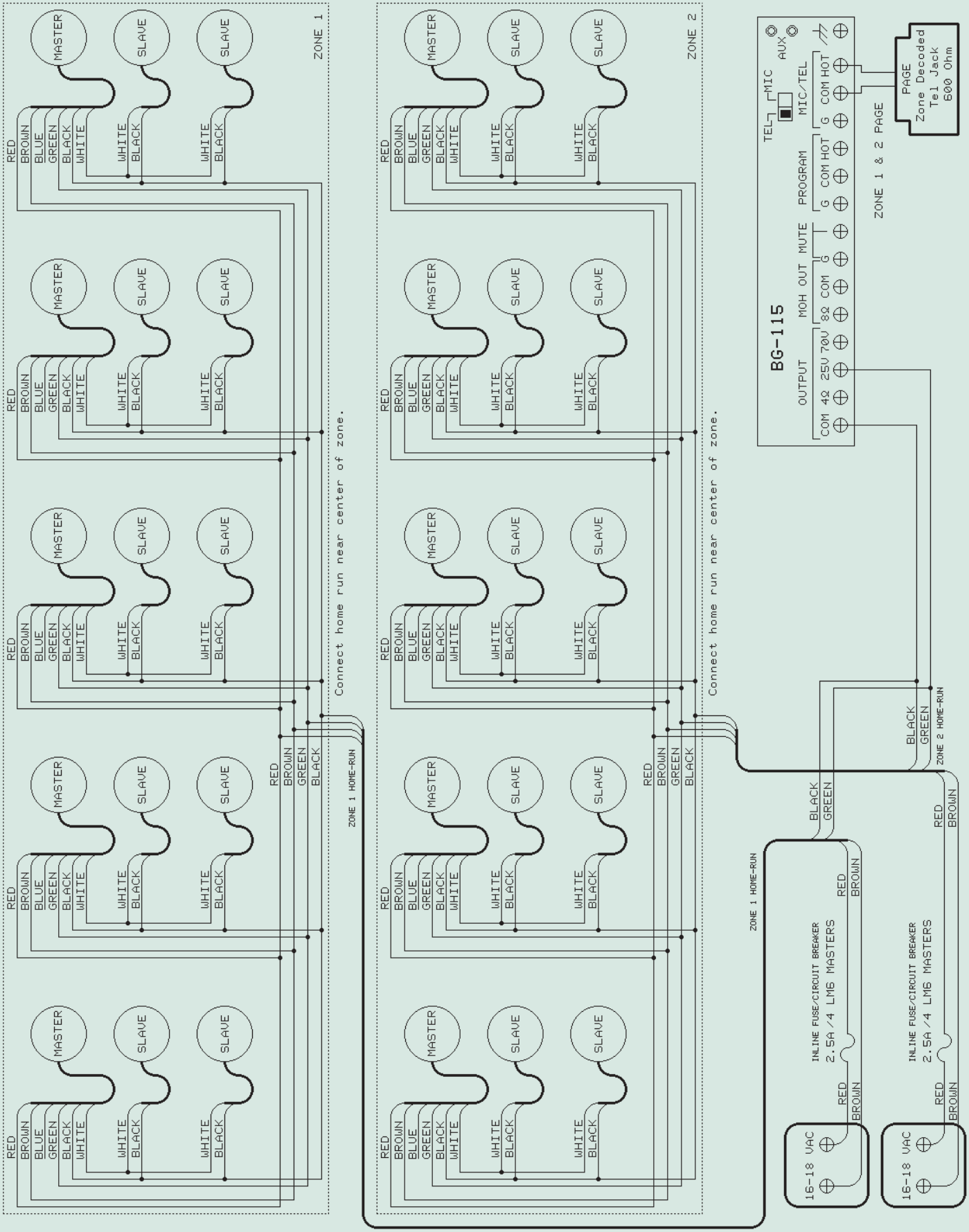


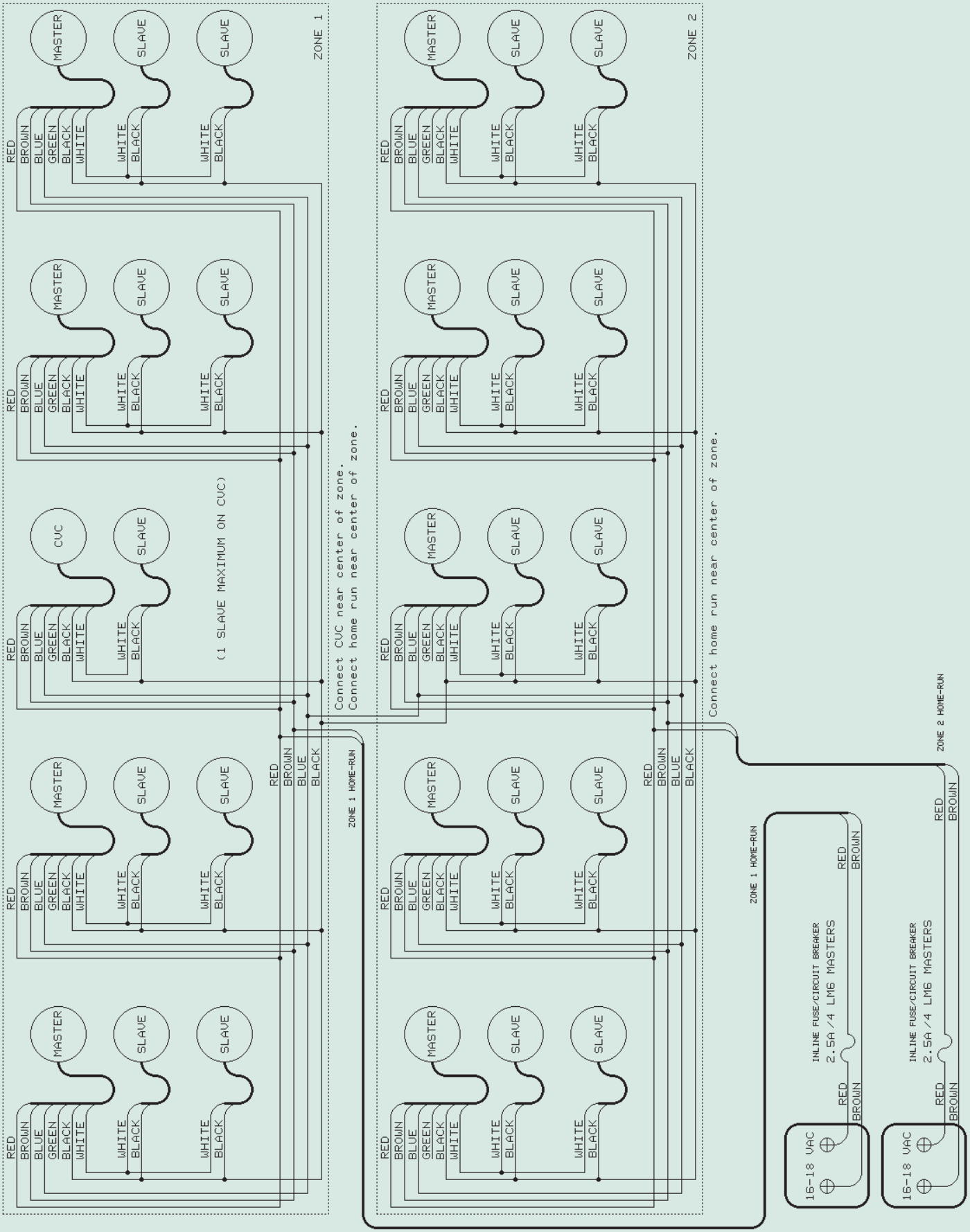
WIRING DIAGRAM - 2 ZONES, 1 CVC, ALL ZONE PAGE/MUSIC



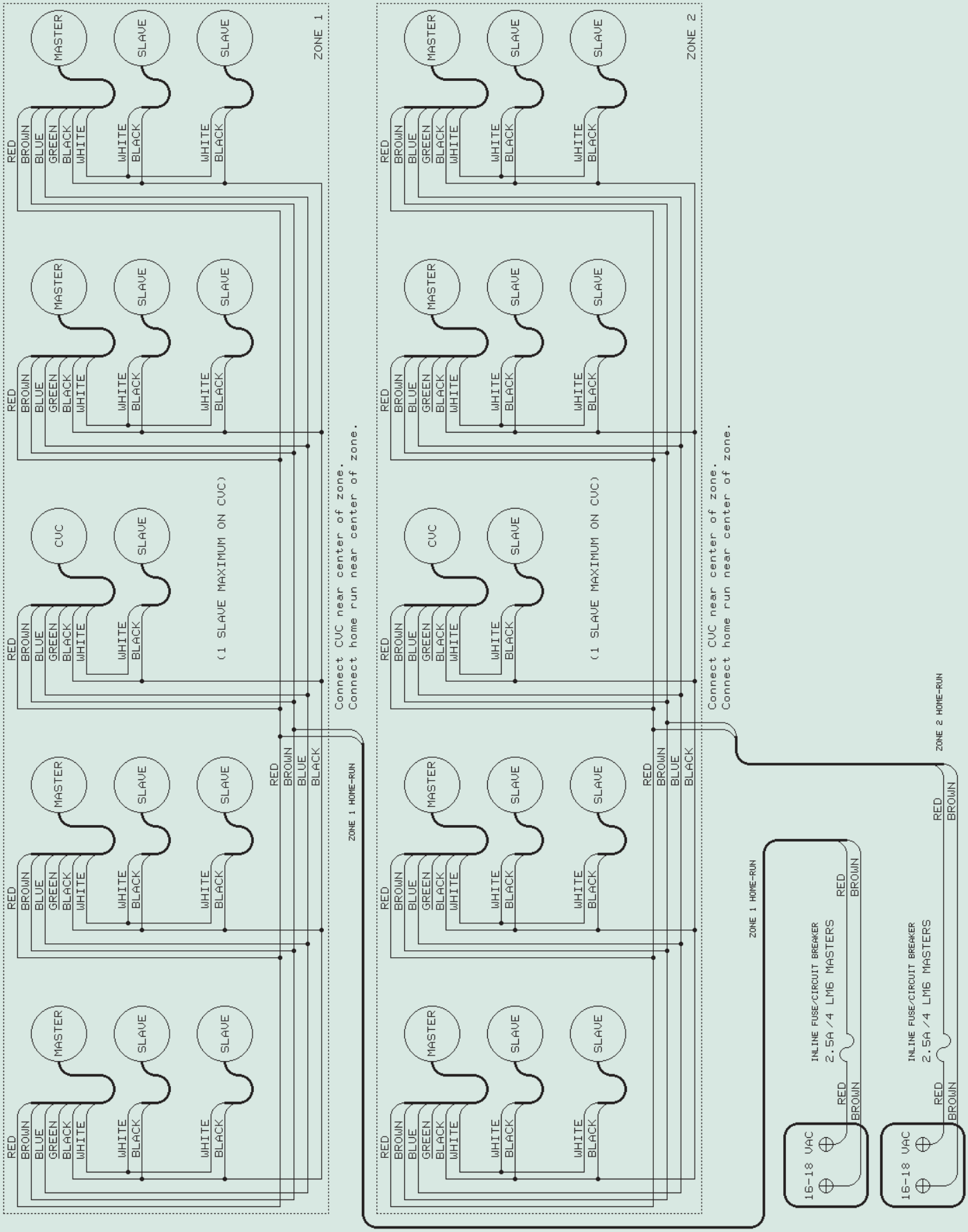
WIRING DIAGRAM - 2 ZONES, NO CVC OR TIMER, ALL ZONE PAGE/MUSIC



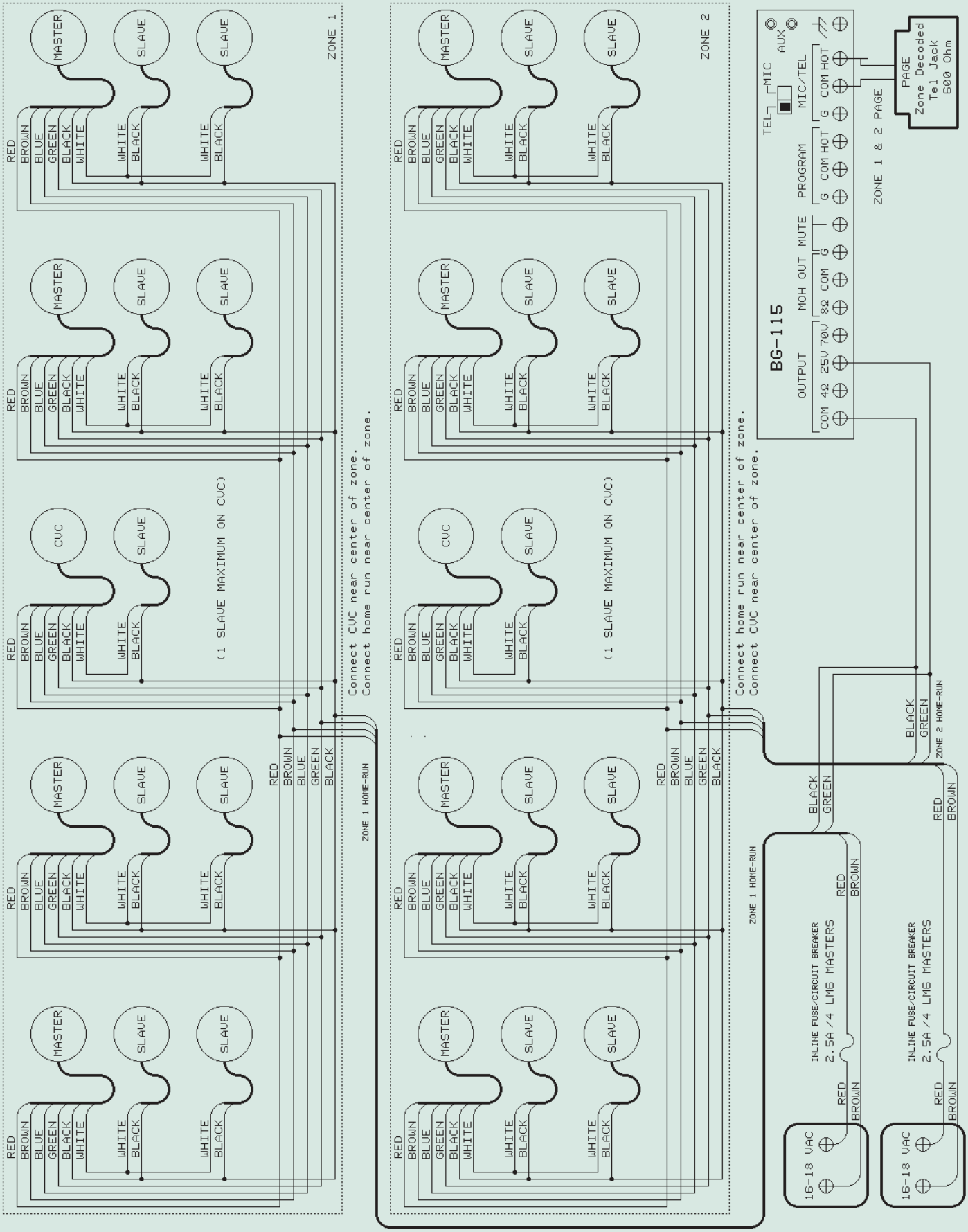
WIRING DIAGRAM - 2 ZONES, 1 CVC, NO PAGE/MUSIC



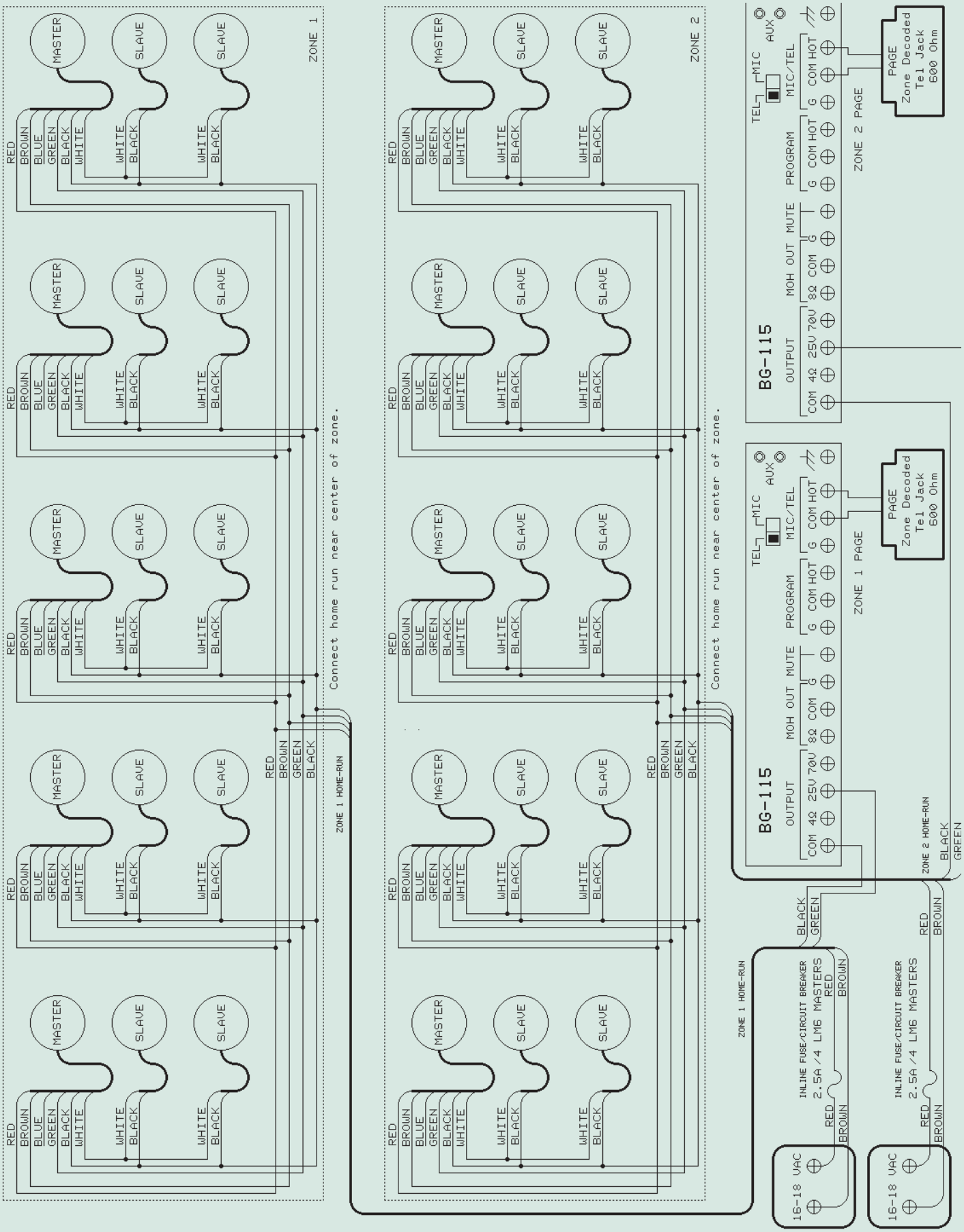
WIRING DIAGRAM - 2 ZONES, 2 CVC'S, NO PAGE/MUSIC



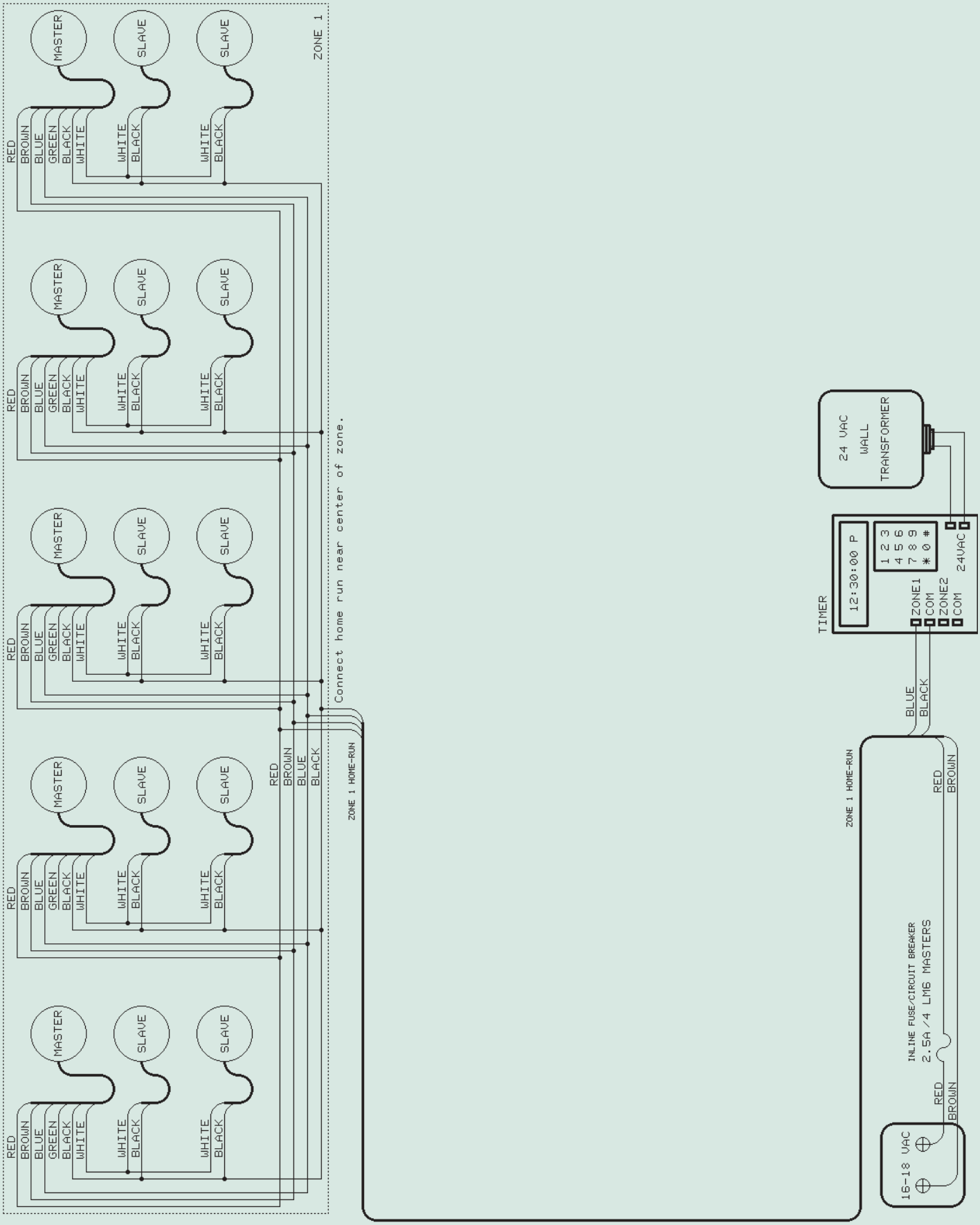
WIRING DIAGRAM - 2 ZONES, 2 CVC'S, ALL ZONE PAGE/MUSIC



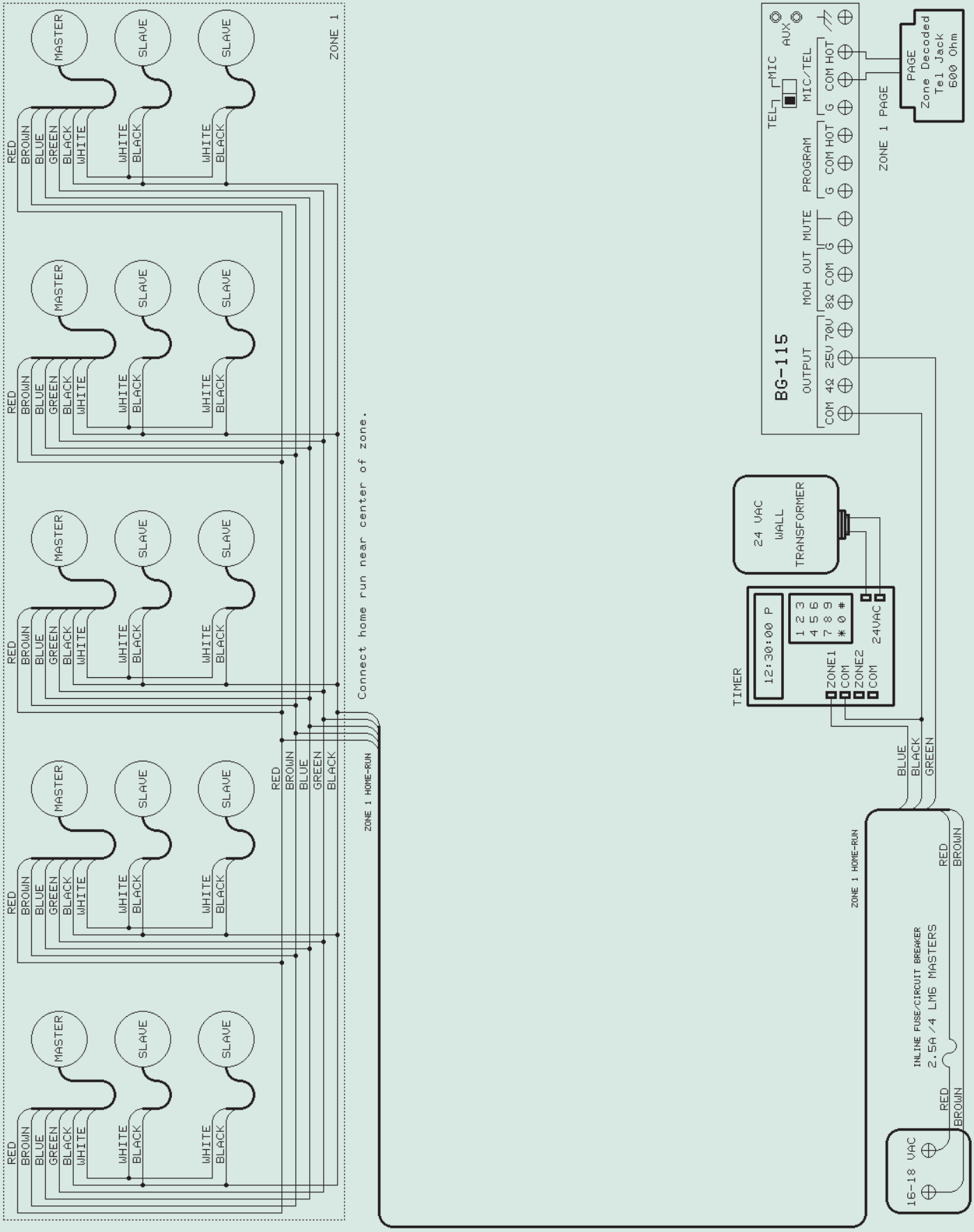
WIRING DIAGRAM - 2 ZONES, NO CVC OR TIMER, 2 ZONE PAGE/MUSIC



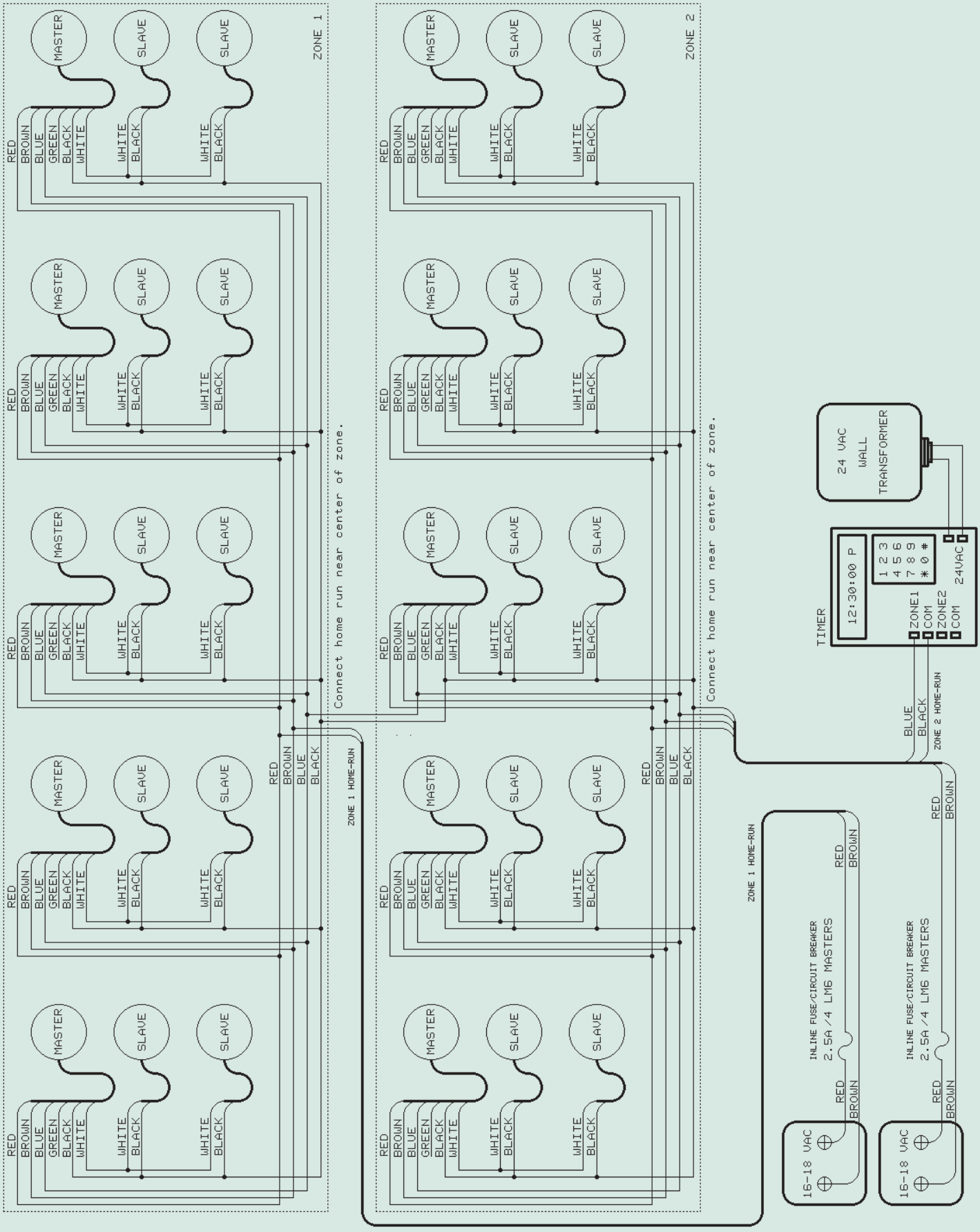
WIRING DIAGRAM - 1 ZONE, 1 TIMER, NO PAGE/MUSIC



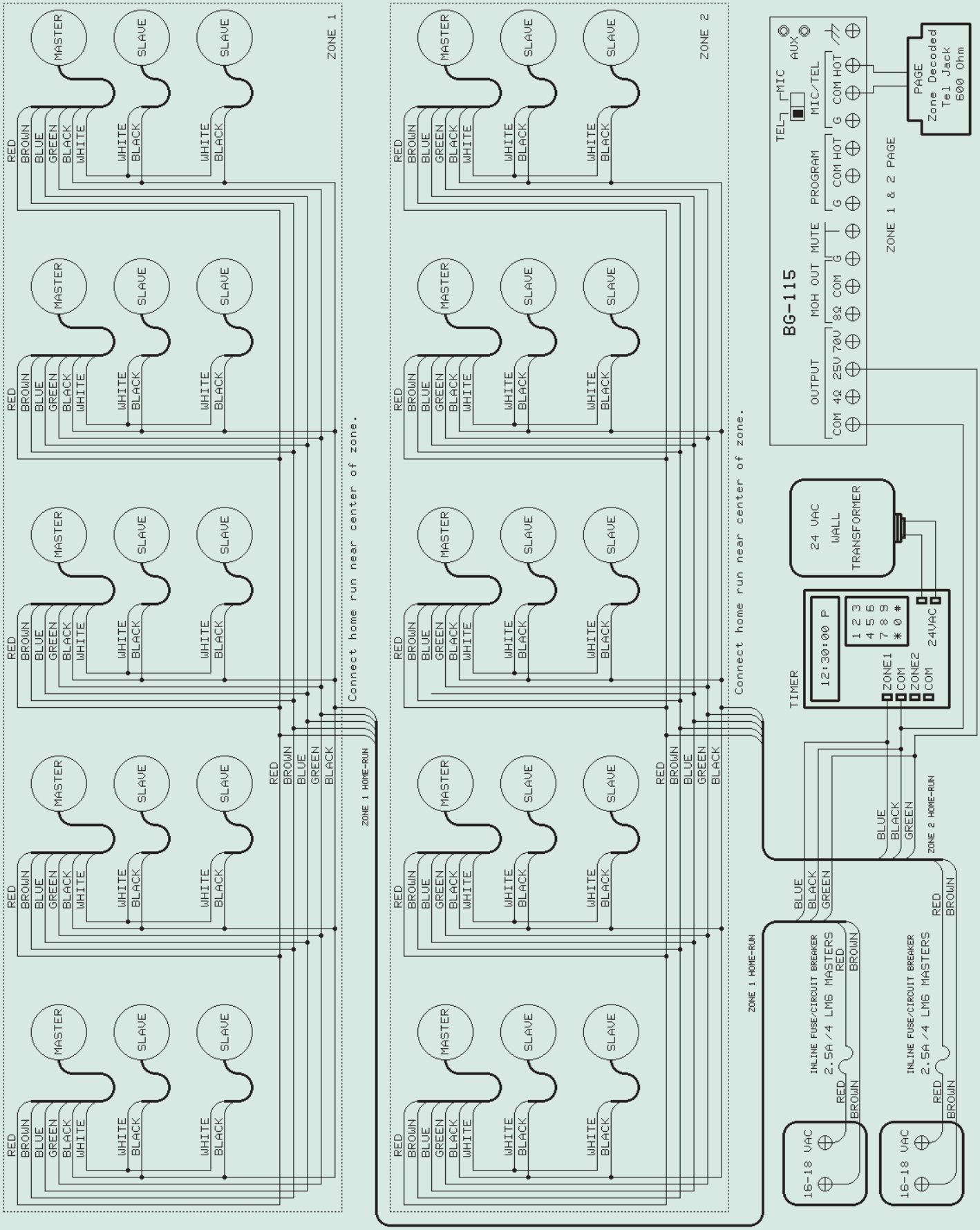
WIRING DIAGRAM - 1 ZONE, 1 TIMER, 1 ZONE PAGE/MUSIC



WIRING DIAGRAM - 2 ZONES, 1 TIMER TO ALL ZONES, NO PAGE/MUSIC



WIRING DIAGRAM - 2 ZONES, 1 TIMER TO ALL ZONES, ALL ZONE PAGE/MUSIC



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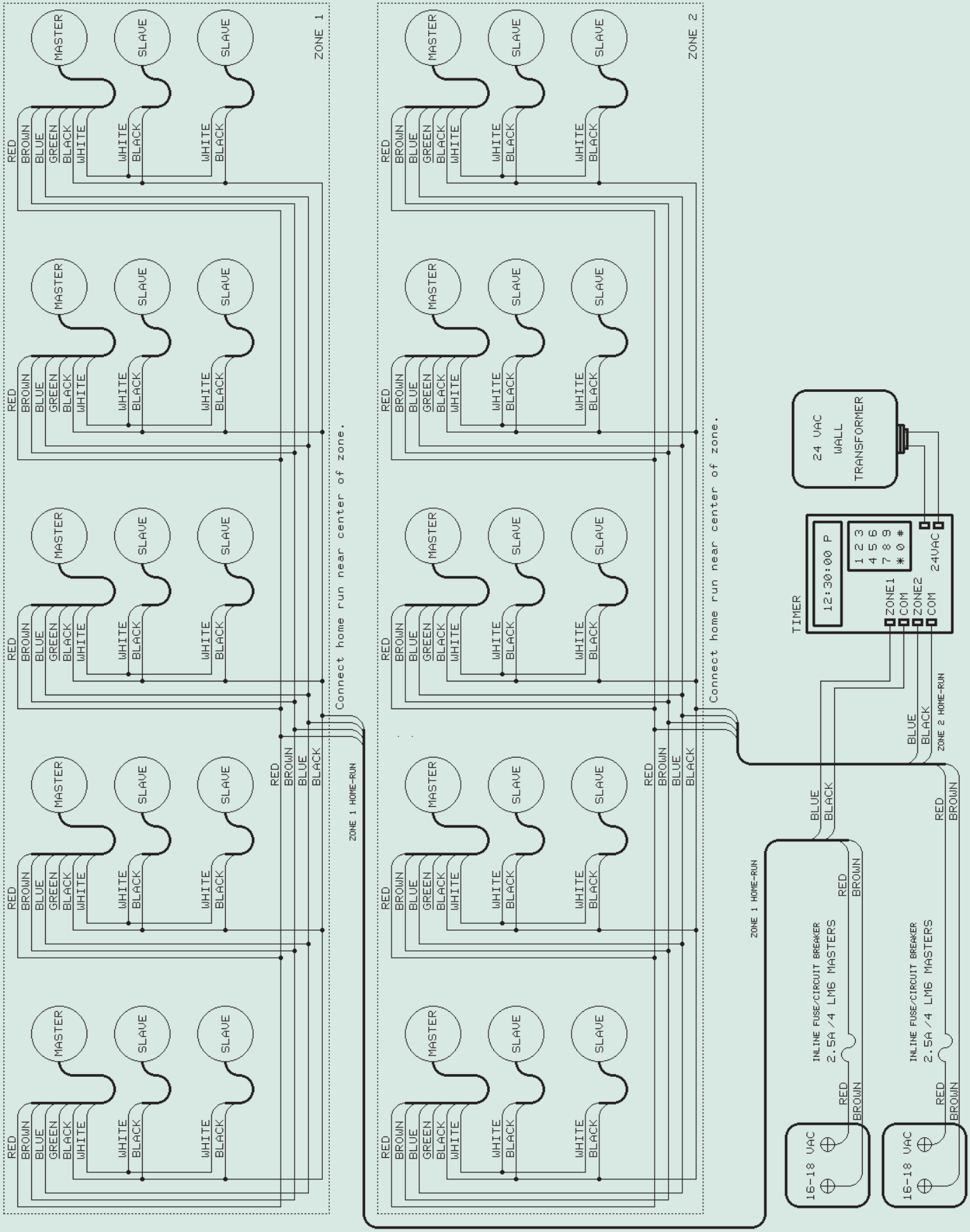
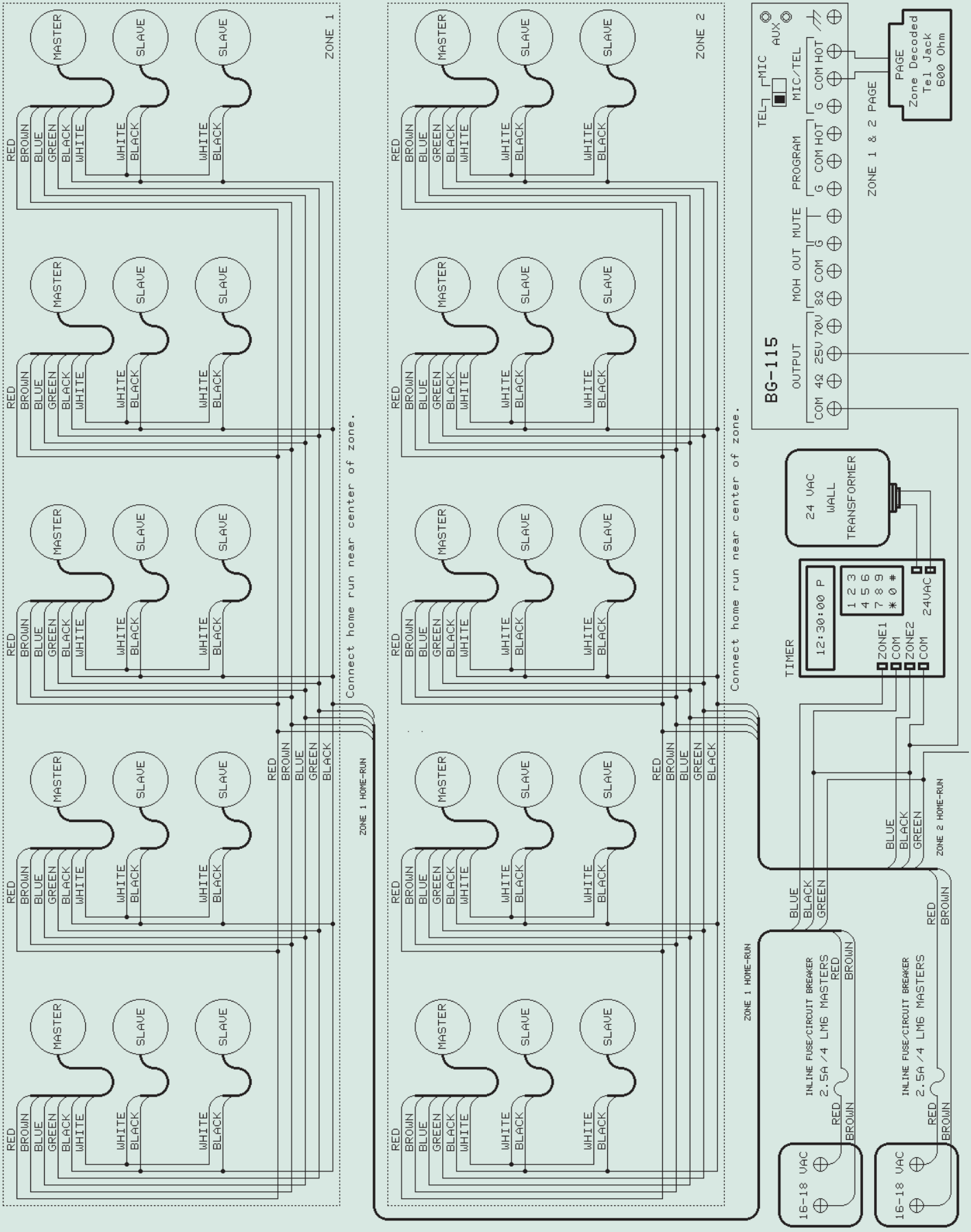
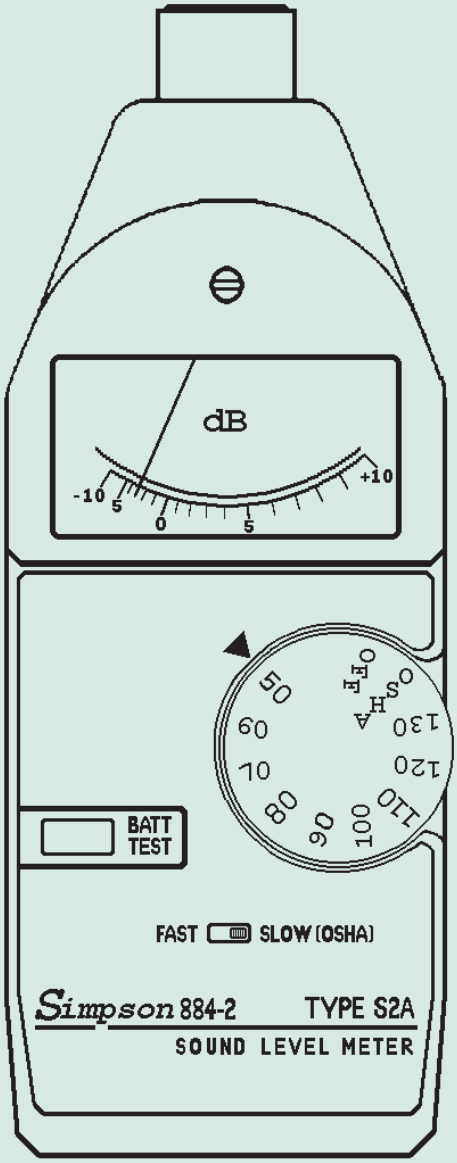


WIRING DIAGRAM - 2 ZONES, 2 ZONE TIMER, ALL ZONE PAGE/MUSIC





TURN RANGE SWITCH TO 50.
TURN SLOW/FAST SLIDE SWITCH TO SLOW.
PLACE SOUND LEVEL METER 4 FEET ABOVE GROUND.
NOTE METER READING AFTER 1 MINUTE.
METER READING SHOULD BE -3 DB.
FINAL READING IS RANGE {50} ADDED TO METER {-3}
FINAL READING: 47 DB

NOTES

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